

## ABSTRACT OF THE DISCLOSURE

Electrode active materials comprising lithium or other alkali metals, a transition metal, a phosphate or similar moiety, and a halogen or hydroxyl moiety. Such electrode actives include those of the formula:



wherein

- (a) A is selected from the group consisting of Li, Na, K, and mixtures thereof, and  $0 < a \leq 6$ ;
- (b) M comprises one or more metals, comprising at least one metal which is capable of undergoing oxidation to a higher valence state, and  $1 \leq b \leq 3$ ;
- (c)  $XY_4$  is selected from the group consisting of  $X'O_{4-x}Y'_x$ ,  $X'O_{4-y}Y'_{2y}$ ,  $X''S_4$ , and mixtures thereof, where X' is P, As, Sb, Si, Ge, S, and mixtures thereof; X'' is P, As, Sb, Si, Ge and mixtures thereof; Y' is halogen;  $0 \leq x < 3$ ; and  $0 < y < 4$ ; and  $0 < c \leq 3$ ;
- (d) Z is OH, halogen, or mixtures thereof, and  $0 < d \leq 6$ ;

wherein M, X, Y, Z, a, b, c, d, x and y are selected so as to maintain electroneutrality of said compound.

In a preferred embodiment, M comprises two or more transition metals from Groups 4 to 11 of the Periodic Table. In another preferred embodiment, M comprises  $M'M''$ , where  $M'$  is at least one transition metal from Groups 4 to 11 of the Periodic Table; and  $M''$  is at least one element

from Groups 2, 3, 12, 13, or 14 of the Periodic Table. Preferred embodiments include those having where  $c = 1$ , those where  $c = 2$ , and those where  $c=3$ . Preferred embodiments include those where  $a \leq 1$  and  $c = 1$ , those where  $a = 2$  and  $c = 1$ , and those where  $a \geq 3$  and  $c=3$ . This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode having a compatible active material; and an electrolyte.